

Opinions of Rhode Island Physicians on Automated Multiphasic Screening

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AUTOMATED multiphasic screening exists today as a limited and controversial part of health care in the United States. The Rhode Island multiphasic screening (MPS) program was started in 1968 as one of four demonstration projects in health screening initiated by the Public Health Service. Its operation was based on the acceptance of two concepts: (a) that periodic health assessment does have value and (b) if chronic disease is uncovered early its subsequent course may be altered (1).

Recently, automated multiphasic screening has been cited as a potentially useful technique in the delivery of health care quite apart from its original concept as a device for preventive medicine in detecting the early stages of diseases through mass screening of the population. It has been proposed as a means of combating the rising costs of medical care and the shortage of skilled medical manpower (2), functioning as an aid to private physicians in examining their patients, as a point of entry for the "undoctored population" into the health care system, as an efficient method of pre-

hospitalization or other required medical physical examination, and as a means of collecting a data base for personal medical records or epidemiologic surveys (3).

Whether automated multiphasic screening can prove to be of value in meeting these goals is an important question that is not easily answered. Existing automated health testing centers have not been functioning long enough, nor has the scope of their operations been extensive enough, to evaluate fully their effectiveness in detecting disease in the population and their yield in terms of cost benefits (3a).

Equally as important as the scientific and economic value of multiphasic screening is the acceptance of its concepts and application in medical care by the medical profession. A recent survey by Bates and Mulinare (4) concludes that although physicians have an unmet need for screening tests, their attitudes toward these tests "appear to be highly ambivalent."

In Rhode Island, physician opinion concerning the MPS center at the Rhode Island Hospital in Providence is particularly important for its operation. As the screening program is currently operated, participants are not accepted unless they have a resource (that is, a private physician or clinic) to which the test data can be sent for interpretation as part of a complete health examination. Thus the program is not an end in itself but is completely useless to the participant unless the result is interpreted to him by his physician.

Physician opinion is also important when plan-

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ning the role of multiphasic screening within the hospital setting. Too often, decisions on health care delivery have been made with little participation by the physician, either because of his lack of initiative in giving an opinion or because of the absence of any device to assess the total attitude of the profession.

For these reasons, physicians on the medical staff of the Rhode Island Hospital were surveyed to assess their opinions concerning the value of the Rhode Island MPS center as it is currently operated. From this survey, then, perhaps an evaluation of the screening center's operation and suggestions for its future in the delivery of medical care at the hospital can be made.

Method

A questionnaire was sent to 384 physicians who were listed as active or as consulting members of the hospital's medical staff. These physicians represented approximately one-third of the active licensed physicians in the State. All physicians on the staff were given an opportunity to express their opinions on the use of multiphasic screening even though some were not directly involved with it in their personal practice. The questionnaire contained 32 questions (115 multiple-part questions) designed to elicit a broad spectrum of opinions about the MPS center and health screening and related concepts in general. The returned questionnaires were scrutinized for written comments, and the replies checked on the completed questionnaires were key-punched for evaluation of the data by computer.

The 202 questionnaires received by January 31, 1971, were evaluated and form the basis of this report. Fifty-three percent of the physicians responded—less than the percentage hoped for but a fairly good response considering the extent of the questionnaire and the subject matter, which is probably of little concern to many physicians who have not had much contact with multiphasic screening in their private practices. The highest rate of return (66 percent) was for specialists in internal medicine and those who classified themselves as general practitioners. These physicians are most likely to be involved with multiphasic screening in their practices. In other major categories, 55 percent of the gynecologists, 54 percent of the pediatricians, 48 percent of the surgeons, and 42 percent of other physicians on the hospital staff replied.

Some specialized physicians, by the nature of

their work, would not have patients going through the screening center. This fact may be one reason, for example, why only one of 10 anesthesiologists responded to the questionnaire. Also, the hospital medical staff included many retired physicians. Although a response of 53 percent is not especially high, the respondents probably were those most interested in multiphasic screening and for whom multiphasic screening is most applicable.

Many questions were evaluated statistically. First, the questionnaires of physicians who had received a patient summary printout from the MPS center—and presumably were familiar with the screening operation in relation to their practice—were separated from those of physicians who had not received one. Then contingency tables and chi-square evaluations (5) were made of several questions to determine if any relationships existed between certain characteristics of the physicians surveyed (for example, medical specialty and type of practice) and various opinions on the value and place of multiphasic screening.

Because the questionnaire was so extensive, no attempt will be made to reproduce all the results and statistical evaluations; only those questions most pertinent to the aim of the survey will be discussed.

Results

General opinion. The most important item in the survey may have been simply the physician's professional opinion of the Rhode Island MPS program. Surprisingly, 70 percent of the physicians, as follows, checked that they "strongly favor" or "somewhat favor" the program.

<i>Response</i>	<i>Percent</i>
Strongly favor.....	30
Somewhat favor.....	40
Somewhat oppose.....	9
Strongly oppose.....	5
No opinion.....	12
No answer.....	4

These results show a basic acceptance of the screening program by the hospital staff as a whole, although they should not be interpreted as meaning that most physicians are completely satisfied with multiphasic screening as it is now operated.

The group that had received a patient summary printout from the screening center (67 percent of the respondents) showed similar percentages: 74 percent favored the program, 17 percent were opposed, and 9 percent gave no opinion or no answer. In general, physicians whose patients had

gone through the screening center favored the program, but 17 percent of the physicians still opposed it.

Another direct question asked whether the costs of automated multiphasic screening (approximately \$40 per patient at the center) were worth the medical benefits obtained. Forty-six percent "mostly agree," while 32 percent "mostly disagree," and 22 percent had "no opinion" or gave no answers. A less favorable response to this question is significant since many physicians who generally favor the program must feel that the costs are excessive. Future refinements in screening should include an attempt to reduce costs—best done in conjunction with a general cost-benefit evaluation.

No significant correlation was found between medical specialty or arrangement of practice and total opinion of multiphasic screening. Thus it cannot be said that a particular group of physicians favor or oppose multiphasic screening. Correlating the specialty and economic worth of multiphasic screening showed significance ($X^2 = 18.65$) at the $P = 0.05$ level, but just barely. Twenty-four of 51 surgeons, for instance, thought that the screening benefits were not worth the \$40 cost, while other specialties were more generally favorable.

Another question asked why many physicians were not using MPS facilities extensively. The most frequent response (44 percent) was that the tests were not applicable to their specific medical specialty. This response is understandable since pediatricians, for example, would not have occasion for using multiphasic screening in their practice. The next most numerous response (24 percent) was that the tests duplicate some physicians' work or facilities. Many physicians own some of the same diagnostic equipment (for example, electrocardiogram and X-ray) used in screening or have many of the tests done in private medical laboratories.

When correlating these responses with medical specialties, a significant relationship was seen ($X^2 = 34.31$) at the $P = 0.001$ level. An indication of the strength of this correlation is given by the corrected coefficient of contingency, which was equal to .514 (6). More internists and other medical subspecialists (52 percent) than other physicians stated that the tests were a duplication of their work. This answer was not surprising because general medical examinations are most often done by internists.

More interesting, perhaps, is the significant correlation between the opinion that the tests duplicate a physician's work or facilities and the unfavorable opinion concerning multiphasic screening. Twenty-one of the 48 physicians who stated that the tests duplicated their work also checked a mildly opposed or strongly opposed opinion of multiphasic screening. All 10 physicians who were strongly opposed to multiphasic screening also said that it duplicated their work. The X^2 value for these questions was 40.74, which is significant at the $P = 0.001$ level. The corrected coefficient of contingency was equal to .622, indicating a strong association between these factors. Here one can postulate that perhaps a great deal of the opposition to multiphasic screening may be based on a feeling of competition with a physician's private practice. This is not the only possible reason for opposition to multiphasic screening, but such evidence of an economic motive for opposition should not be ignored. Other reasons for not extensively using MPS facilities follow:

<i>Response</i>	<i>Percent</i>
Tests are not applicable to specialty	44
Tests are duplication of own work and facilities	24
Multiphasic screening is not integrated enough into a system of total health care	9
The long waiting list is too inconvenient for patients	8
Too much information is supplied	5
Quality is not good enough	3
Tests are too incomplete	3
Other	11

Quality of multiphasic screening. The physicians' opinions concerning the quality of the MPS tests were important in their evaluation. The quality of the screening tests is essentially equivalent to that of the same tests used by the Rhode Island Hospital since many hospital physicians and technicians do both tests and apply the same quality controls to each. In a question asking for an evaluation of the general accuracy of the testing done in the Rhode Island MPS program, 23 percent checked "excellent," 36 percent checked "satisfactory," and 8 percent checked a combination of "good and poor"; no physician said the tests were "generally poor." Thirty-three percent checked "no opinion" or did not answer this question. Most physicians who had not received a patient summary did not give an opinion on this question.

Correlating this question with a general opinion of the MPS program showed significance ($X^2 = 10.78$) at the $P = 0.005$ level. Physicians who thought that the accuracy of the tests was a mix-

ture of good and poor were more likely to have a negative opinion of multiphasic screening.

Many comments concerning this question cited false-positive or false-negative cases as reasons for dissatisfaction with the accuracy of the tests. Of the physicians who received a patient summary, 21 percent said they had found that the MPS tests had failed to uncover abnormalities that they were designed to detect (false negatives), while 44 percent said that abnormalities were indicated which subsequently were found to be normal (false positives). These percentages are high, but in reality they do not indicate the extent of false negatives and false positives among all patients tested.

Correlating these questions with opinions of multiphasic screening shows that physicians who have had false positives or negatives tend to have an unfavorable opinion of multiphasic screening ($X^2 = 5.21$ and 4.99), which is significant at the $P = 0.05$ level. Setting proper standards to minimize both false positives and false negatives at the same time is one of the most important and difficult parts of a screening program—maximizing the sensitivity of the tests while still maintaining a high percentage of specificity (7). As stated before, only 3 percent of the physicians responding checked “quality not good enough” as a reason for not using MPS facilities extensively.

Place in a physician's practice. Most important for the private physician is the potential of multiphasic screening in his personal practice. When asked how the test results from multiphasic screening could best be utilized, the following answers were given:

<i>Response</i>	<i>Percent</i>
As a part of periodic physical checkups.....	46
Screening patients as “high risk” for certain diseases.....	45
Consolidation of various tests to save time and money.....	44
As a baseline of medical history data.....	31
As an aid in making diagnoses.....	30
Helpful in unifying records.....	11
No use.....	9
Other.....	3

Apparently many physicians at least see a potential usefulness for multiphasic screening as postulated in the original goals of the screening program.

One primary objection many physicians have raised to a more widespread use of multiphasic screening is that it will lead to unwarranted demands on the physician's time. Twenty-six percent or 52 of the respondents replying said that they thought programs like that of the Rhode Island

MPS center led to unnecessary use of a physicians' services. Of these, 5 percent thought it was a “great deal of time,” 17 percent a “fair amount,” and 4 percent “very little.” This response is significant because one aim of multiphasic screening is to reduce the unnecessary use of a physician's time by substituting paramedical personnel and automated testing in performing many routine portions of a health examination. One reason more than one-fourth of the physicians surveyed felt this way may be that their practice as clinicians is not geared to the asymptomatic screening process, which initially presents a list of medical test results. The usual clinical practice is to examine for symptoms and then order specific tests to investigate a clinical indication. Thirty-eight percent or 52 of the physicians who had received the patient summary thought they were given more information than was necessary, and several made comments to this effect.

If too much information is given, the physician confronted with such a vast amount of test data may tend to ignore it, or he may spend a great deal of time and effort attempting to check all test results outside the “normal” range and fit them into a diagnostic picture. A test result outside the normal range does not always mean, however, that a disease is present, because the normal range of human variability for a given test may not be well established. This basic orientation of clinicians to investigate symptoms rather than to use screening tests as a means of presymptomatic detection presents a real problem in reconciling preventive medical procedures with a physician's private practice (4).

Some physicians also thought that many patients who were self-referrals to the screening center had already had extensive diagnostic testing and that previous work was duplicated. An unnecessary burden therefore was put upon them to go over the screening results. One physician said that the Rhode Island MPS Center was a “good place to send hypochondriacs.”

Another criticism often voiced by physicians concerning multiphasic screening was the feeling that large-scale use of it in a physician's practice would probably lessen his personal relationship with patients. Forty-three percent of the physicians replying agreed with this criticism. Multiphasic screening as now practiced in Rhode Island does not attempt to substitute for a patient's visit to a physician but rather requires patient-physician interaction afterward to complete the physical

examination and interprets the results to the patient.

One real measure of physician support of multiphasic screening in Rhode Island is the number of respondents who referred patients to the center. Of the 202 who replied, 80 physicians (40 percent) stated that they had referred patients to the center. This number is quite large since many physicians in certain specialties would never have occasion to use multiphasic screening results in their practice. The question is highly correlated with specialty of medical practice ($X^2 = 86.71$, significant at the $P = 0.001$ level, and the corrected coefficient of contingency equals .79, indicating a strong association). High percentages of general practitioners and internists and 47 percent of surgeons referred patients to the center.

Testing. Most important in any MPS operation is the choice of tests to be used. Wilson and Jungner (7a) have set some criteria for choosing the tests that should be used in early detection of disease. A discussion of these principles and their application to individual tests, however, is not within the scope of this study. But the opinions of physicians who have dealt with the screening tests is extremely important, no matter what the theoretical arguments may be for or against a certain test. In short, for a test to be useful in the MPS context, it must be accepted by the physician to whom the information is sent.

The various ratings given to individual screening tests by physicians who received patient summaries from the center (68 percent of respondents) are shown in the table. Although the three categories are not mutually exclusive, most physicians checked only one of the three responses for a given test. Approximately 15 percent of this group did not provide an answer for any given question.

Mammography was criticized by 10 physicians for yielding too many false positives and by seven physicians, for too many false negatives. Audiometry also was criticized by nine physicians for a large number of false positives. In addition, seven of 10 physicians who commented on the accuracy of the testing in general mentioned that the audiometry was of low quality, mainly because of difficulties in obtaining patient cooperation. Eight physicians also criticized urine cultures for producing a large number of false positives. Some ophthalmologists criticized the accuracy of tonometry testing and the value of the single retinal photograph.

Only 33 physicians suggested additional tests: psychological; rectal examination or sigmoidoscopy; more extensive vaginal or pelvic examination; more extensive breast examination; blood lipid, lipoprotein, or protein; blood enzyme; spinal or skull X-rays; and physical inspection.

Concept of screening. An overwhelming majority of respondents thought the basic principles of screening were correct. To the statement that early detection of disease can generally prolong a patient's life, 95 percent checked "mostly agree." As the primary MPS goal, large-scale screening of the population to detect people who are "high risk" to certain diseases was marked "mostly agree" by 77 percent, 10 percent disagreed, and 13 percent gave no opinion or no answer.

Screening as a concept is less accepted as part of a physician's private practice. Screening patients as "high risk" for certain diseases as a response to a question asking how the test results from multiphasic screening could best be used by the responding physician was checked by only 45 percent. Other responses to this question are given in the tabulation on page 369.

The operation of the Rhode Island MPS Center was designed to include a battery of laboratory tests to support periodic health examinations by physicians. No test is considered diagnostic without interpretation by the physician and further personal examination of the patient. The screening tests are not designed to detect many disease processes that physicians sometimes check for in an

Physician evaluation of individual tests, percent

Test	Most useful	Could be eliminated	Duplication
Tonometry.....	71	8	7
Chest X-ray.....	71	3	20
Blood glucose.....	68	3	25
Hematology.....	64	2	31
Biochemistry.....	63	8	20
Serology.....	62	5	23
Electrocardiogram.....	59	7	30
Stool guaiac.....	52	7	31
Spirometry.....	58	21	11
Visual acuity.....	57	18	15
Papanicolaou smear.....	54	6	39
Urinalysis with microscope.....	53	4	38
Audiometry.....	52	26	4
Mammography.....	52	28	3
Peripheral vascular.....	45	20	29
Urine culture.....	43	36	4
Medical history questionnaire..	42	13	45
Blood pressure.....	40	7	59
Retinal photograph.....	39	39	10
Height, weight, and temperature.....	30	12	28
Achilles tendon.....	25	43	20

examination (for example, listening to a patient's heart with a stethoscope). Not every physician surveyed, however, thought that followup examinations of all patients were necessary: 49 percent said that all patients should receive further examination; 35 percent said that only those with abnormal conditions, as shown by testing, would need further examination; and 16 percent gave no opinion or did not answer this question. The 35 percent figure indicates a basic disagreement with the philosophy of testing as designed at the Rhode Island MPS Center in cooperation with the Rhode Island Medical Society. How many responses were prompted because individual patients that were screened had well-known histories and physical conditions cannot be judged from the data.

Preferences for the kind of people most appropriate for the screening population are given in the following tabulation.

<i>Response</i>	<i>Percent</i>
The general population.....	16
People over 35.....	31
People over 50.....	32
Only people over 35 but under 65.....	8
People not now under care of a physician....	42
People who suspect they have symptoms of disease.....	21
People who believe themselves to be well....	17
Other.....	10

Most significant in these responses was the 42 percent who checked that MPS programs are appropriate for people not now under the care of a physician. Also in the comments given there seemed to be a strong feeling that MPS programs should be aimed at persons who do not see a family physician or internist regularly.

In Rhode Island, the MPS program has been restricted to the age group 40 and over. A specific recruitment attempt was made, without great success, through the local Office of Economic Opportunity to bring people from so-called medically disadvantaged areas into the screening program (personal communication, H. Constantine, associate professor of medical sciences, Brown University, December 31, 1970). Selecting people who would benefit most from the screening tests and subsequent examination by a physician, and enticing these people to participate, seems to be one of the biggest problems of MPS programs.

Place in medical care system. Supporting the idea that multiphasic screening could be useful in reaching the undoctored population is the response to the statement that multiphasic screening could be useful as a means of entry into the medical care

system. Seventy-one percent of the physicians checked "mostly agree" to this proposal, 15 percent checked "mostly disagree," and 14 percent either checked "no opinion" or gave no response.

The following responses were given to the question concerning what segments of the total health care delivery system multiphasic screening could best be a part.

<i>Response</i>	<i>Percent</i>
Referral by a private physician.....	61
Neighborhood health centers.....	52
Ambulatory care services of hospital.....	49
Preadmission to hospital (nonemergency)....	46
Outpatient department of hospital.....	40
As part of an overall medical care service of the hospital to the surrounding community.	38
Institutional examinations or personnel health clinics.....	34
Self-referral.....	30

Apparently there is a strong feeling that multiphasic screening should continue to be available for referral by individual practicing physicians. The response concerning neighborhood health centers is in keeping with the opinion previously cited by many physicians that multiphasic screening could be an appropriate means of reaching people not under the care of a private physician. The response concerning overall medical care service of the hospital to the surrounding community indicates support for the concept that a hospital should get involved with the delivery of primary medical care in the community where it is located. For the Rhode Island Hospital, this means the South Providence area, which is economically depressed and lacks a sufficient number of physicians who disperse private primary care.

To the statement that a hospital's responsibilities, in general, should include concern for the total medical care needs of the community which it serves as well as medical care for its admitted patients, 66 percent checked "mostly agree." Thus a majority of the respondents apparently see the need for the hospital's involvement with primary care in the surrounding community, and a lesser number think that multiphasic screening could be a useful part of this care.

The group most frequently mentioned that should own and administer MPS facilities was the voluntary hospital (59 percent); 37 percent checked government health agencies, 25 percent checked private physicians or groups of physicians, and 21 percent checked private industry or business. The respondents could check one or more groups.

As for financing of multiphasic screening, 60

percent said that this should be done through a private fee, which currently is the situation in Rhode Island. Originally, the Rhode Island MPS Center was subsidized by the Public Health Service and the persons screened were not charged, but funds for this program were not renewed in September 1970, shortly before this survey was made. Half of the physicians thought that health insurance (private, Medicare, Medicaid) should be used to help pay for the cost, 23 percent thought that multiphasic screening should be financed through a prepaid group practice, and 16 percent thought the Government should subsidize everyone.

Future of multiphasic screening. No amount of theoretical discussion can make multiphasic screening a useful part of the medical care system unless individual physicians cooperate with and use the screening facilities. As noted earlier, 40 percent of the respondents said they had referred patients to the MPS center. To the question on how much they anticipated using multiphasic screening in the future, only 7 percent checked "extensively," which indicates that physician demand for multiphasic screening in private practice is not great. Forty-six percent checked "somewhat used." Physicians seem more inclined to use multiphasic screening as it comes up, mainly through self-referral of their patients, rather than to rely on it extensively as an important part of their practice. Thirty-eight percent checked "not to any extent," and 9 percent did not answer this question.

Many physicians in the total group, as stated before, would have no occasion to use multiphasic screening because of their specialty or arrangement of practice. The answers to this question were correlated with specialty ($X^2 = 17.59$), significant at the $P = 0.05$ level. Most physicians who planned to use multiphasic screening extensively specialized in internal medicine or in some medical subspecialty, while obstetrician-gynecologists and pediatricians were more inclined to say multiphasic screening would not be useful to them in the future.

When asked to predict the future use of multiphasic screening, 32 percent said that it would be used "extensively" and 55 percent checked "somewhat used." Only 6 percent checked "not to any extent," and 7 percent gave no answer. Thus almost all physicians apparently believe that multiphasic screening will be used in medical care in the future.

The place of multiphasic screening in the medical care system of Rhode Island is currently undecided. As shown earlier, many physicians thought that multiphasic screening could be used as part of the regular operation of a hospital. For the Rhode Island MPS Center, much is still to be planned in its relationship to the Rhode Island Hospital.

To the question of whether the hospital should incorporate multiphasic screening into its medical care delivery system, 43 percent of the physicians responding—all members of the medical staff of the Rhode Island Hospital—replied "Yes," 28 percent replied "No," and 24 percent checked "no opinion" to this highly controversial question; 5 percent did not answer the question.

Responses to this question did not seem to be correlated with either specialty or arrangement of medical practice. Thus, although a majority of the staff physicians replying thought that multiphasic screening should become part of the normal operation of the Rhode Island Hospital, a clear majority opinion was lacking because many physicians gave no opinion. Perhaps many of them thought that they could not offer a valid judgment on incorporating multiphasic screening into the hospital operations unless a specific plan for doing so was presented.

Conclusion and Recommendations

The results of this study indicated a generally favorable viewpoint toward automated multiphasic screening and the Rhode Island MPS Center by responding physicians on the medical staff of the Rhode Island Hospital. Seventy percent of the physicians who replied said that they either "somewhat favored" or "strongly favored" the Rhode Island MPS program, while only 14 percent said that they were "opposed." Such a favorable opinion of multiphasic screening was a surprise to me and to many of the interested hospital staff members. This result contrasted sharply with the more negative general attitude toward multiphasic screening expressed in staff meetings and informal conversations. Perhaps the impact of objections from a vocal minority too often influences decision making involving physicians unless their opinions are assessed through such instruments as questionnaires.

The favorable opinion given was tempered by doubts as to the impact of the program in actually meeting the medical care needs of Rhode Island, concerns with interference in the individual physi-

cian's role in private medical practice, and disagreements with some of the basic concepts of screening for inapparent disease upon which the beginning of the Rhode Island MPS Center was based.

With these thoughts in mind, some possible uses of multiphasic screening can be proposed, based on the results of this survey.

Automated multiphasic health testing could become an integral part of clinical medical practice. It could be integrated into ambulatory patient care services at hospitals. As to the place of multiphasic screening in the medical care system, the staff physicians seemed to realize that the hospital has to get more involved in the delivery of primary medical care to the surrounding community. Furthermore, many techniques used in screening could be adapted to the normal uses of the hospital for its admitted patients, especially preadmission tests in nonemergency cases.

Multiphasic screening could be used in the operation of neighborhood health centers. This was a popular suggestion made by more than half of the physicians in the survey. Indeed, the Rhode Island MPS Center was criticized often because it was not reaching more people who were not now in the mainstream of medical care. A consistent comment was that multiphasic screening should reach more of the undoctored population, or, for the most part, persons without sufficient economic resources for private medical care.

Ironically, while many physicians emphasized that multiphasic screening could be a useful means of reaching people not under the care of a private physician, many criticized multiphasic screening for duplicating some of their own services. Certainly these positions are irreconcilable. If multiphasic screening is expected to serve some people as a partial compensation for not having a private physician, then it could be expected to duplicate much of what is done in a private physician's office. Many screening tests at neighborhood health centers could be run in conjunction with a hospital's operation, which would save costs. Part of the screening could include an actual physical examination by a clinic physician because most people coming to these centers presumably do not have a family physician.

Multiphasic screening could also become an important part of private medical practice if it were modified or made flexible enough to meet the specific needs of more physicians. Clearly, a majority of physicians in the study thought that multiphasic

screening should be kept available for referral to private physicians. Perhaps batteries of certain tests could be run or tests that a physician thinks are unnecessary for a particular patient could be omitted.

Concurrently, and perhaps more importantly, more physicians could orient their methods of practice closer to the concepts of early detection and periodic health assessment. Currently, most physicians start with apparent symptoms or complaints and have specific tests done to verify a tentative diagnosis. A more scientific approach would be to gather data first and actively search for presymptomatic disease before making diagnoses based on as much information as possible.

In all these proposals, multiphasic screening should result in the development of standardized personal medical records that could be easily understood and readily transferred from physician to physician or between institutions. The collection of an extensive data base for patients could prove to be invaluable in later medical diagnoses.

The results of this survey showed significant support for many of these proposals. Naturally, full commitment to any of them depends on the details of how such programs might be planned, remembering the needs of both the medical profession and especially those of the consumer of medical care. The type of testing done in multiphasic screening may have to be completely re-evaluated because of new specific goals and new research results.

As a pilot program, the Rhode Island MPS Center has been more of a testing ground for the feasibility of using automated testing techniques than as a provider of medical care services. As mentioned before, the concept of screening is only one of many potentially useful goals of multiphasic screening. Such techniques may be necessary in the not too distant future as a means of coping with the rising demand for medical care services, especially as more economic barriers of entry into the medical care system are removed.

The inevitable advent of national health insurance or some other form of prepaid medical care that will cover all segments of the population may completely overwhelm medical care sources as they are presently constructed. Medical practice therefore must be prepared not only to treat those persons currently receiving inadequate medical care but also to deal with the onslaught of the "worried well," as Garfield has put it (8), which may become the greatest strain on medical care

services. Automated multiphasic screening may be one of the best means for dealing with large volumes of medical care demands while still conserving the valuable time of a physician and keeping costs at a minimum. Thus multiphasic screening may become a necessary component of a rational system of health care that is able to encompass the entire population.

Before multiphasic screening is cast aside as impractical or becomes lost in the myriad functions of the modern medical care center, it is important that the basic concept of screening the population for early detection of disease is not lost. Besides better technical organization, this concept needs more basic scientific research into disease processes and incidence in the population. The detection and treatment of debilitating disease should be emphasized before the disease has developed and damage has already been done to the individual as a person and to society if he becomes a burden to it.

Perhaps automated multiphasic screening can be proved to be a useful means of accomplishing this goal. The physicians responding in this survey seemed generally to accept multiphasic screening. Perhaps it can be used to improve the quality of medical care for all persons. The future of auto-

mated multiphasic screening is undecided, and more pilot programs and studies are needed to prove its usefulness in meeting the increasing demands for medical care services.

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The opinions of physicians on the medical staff of the Rhode Island Hospital concerning automated multiphasic screening and the Rhode Island Multiphasic Screening Center were studied. The results indicate a generally favorable viewpoint of the respondents; 70 percent either somewhat favored or strongly favored the Rhode Island multiphasic screening program, while only 14 percent said that they were opposed to it.

The use of multiphasic screening as a means of entry into the medical care system received the support of 71 percent. A large number of physicians felt that the best use for multiphasic screening

was in reaching persons without the regular care of a private physician, although a majority still desired to have the facilities available for private referral. Areas cited for the best use of multiphasic screening were neighborhood health centers, hospital ambulatory care services, and preadmission testing. Forty-three percent of the physicians thought that the Rhode Island Hospital should incorporate multiphasic screening into its medical care delivery system.

These favorable opinions were tempered by doubts as to the impact of the program in actually meeting the medical care needs

of Rhode Island, concerns with interference in the individual physician's role in private practice, and disagreements with some basic concepts of presymptomatic screening.

Tests checked often as "most useful" included tonometry, chest X-ray, blood glucose, hematology, biochemistry, serology, and the electrocardiogram. Hematology and the electrocardiogram were checked by many physicians as being a duplication.

Most physicians thought the following tests could be eliminated: Achilles tendon, retinal photograph, urine culture, mammography, and audiometry.